

Cochlear Dead Regions: Some remaining questions

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The questions are: “Can we?” and “Should we?”.

1) Do the TEN task, PTCs, or other methods allow efficient and accurate assessment of dead regions? (Can we?)

2) Does the assessment of dead regions provide information which is likely to have an important influence on clinical decisions? (Should we?)

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Question 1a: Efficient method of identifying dead regions?

TEN task much more clinically efficient than PTC task.

TEN task: Test for dead region at one probe frequency involves measuring one masked threshold (single frequency tested in < 1 minute)

PTC task: Test for dead region at one probe frequency involves measuring masked thresholds for multiple narrowband maskers (single probe frequency requires > 5 min)

Question 1b: Accurate method of identifying dead regions?

Published comparisons of TEN and PTC results:

Moore, B.C.J. Huss, M., Vickers, D.A., Glasberg, B.R.
& Alcántara, J.I. (2000). *Brit J. Aud.*, 34, 205-224.

Summers, V., Molis, M.R., Müsch, H., Walden, B.E.,
Surr, R.K., & Cord, M.T. (2003). *Ear & Hearing*.

Method (both studies)

Subjects:

14 listeners (19 ears) with sensorineural loss

(Moore et al., 2000)

17 listeners (18 ears) with steeply sloping
high-frequency loss

(Summers et al., 2003)

Experimental tasks:

TEN task (70 dB/ERB)

Psychophysical Tuning Curve task

Moore et al. (2000, Brit. J. Audiology)

Results:

3 of 19 ears showed “false positive” TEN results

? of 19 ears showed TEN, PTC results in agreement

? of 19 ears showed ambiguous TEN results
precluding comparison with PTC results

~16 % of subjects showing inconsistent TEN, PTC results

Summers et al. (2003, Ear & Hearing)

Results:

10 of 18 ears – TEN, PTC results consistent
(or, at least, not inconsistent)

8 of 18 ears – TEN, PTC results disagree at some
frequencies, TEN results indicate dead regions
but PTCs don't ("false positive" TEN results?)

~ 44% of subjects showing inconsistent TEN, PTC results

Current answer to “Can we?”

The clinically efficient method (TEN task) may not provide sufficient accuracy.

The more accurate method (PTCs) may not be efficient enough (too time consuming) to be clinically useful.

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Question 2: Does the assessment of dead regions provide important clinical information? (Should we?)

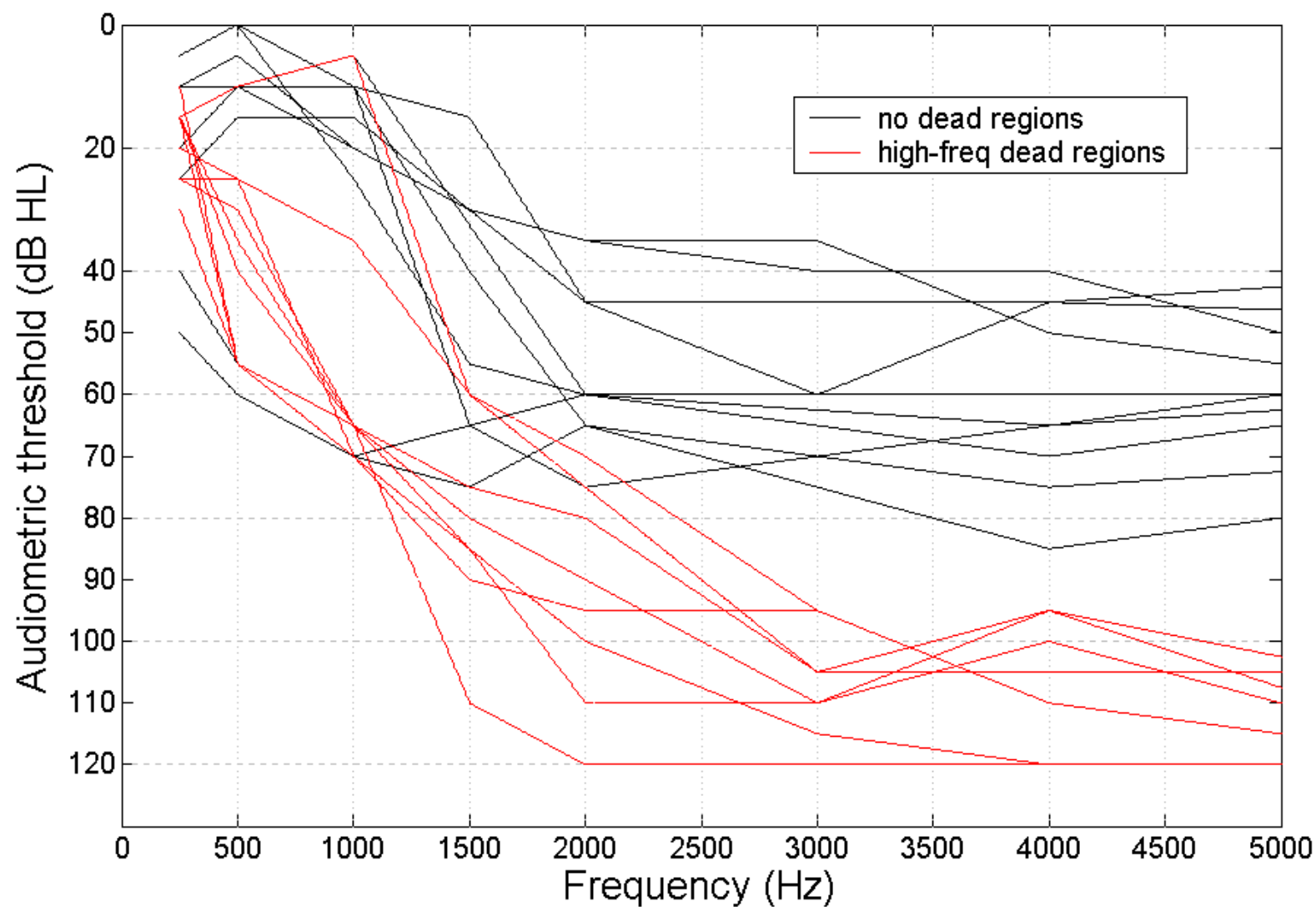
Published comparisons of amplification benefit for listeners with and without high-frequency dead regions:

Vickers, D. A., Moore, B. C. J., & Baer, T. (2001). Journal of the Acoustical Society of America, 110, 1164-1175.

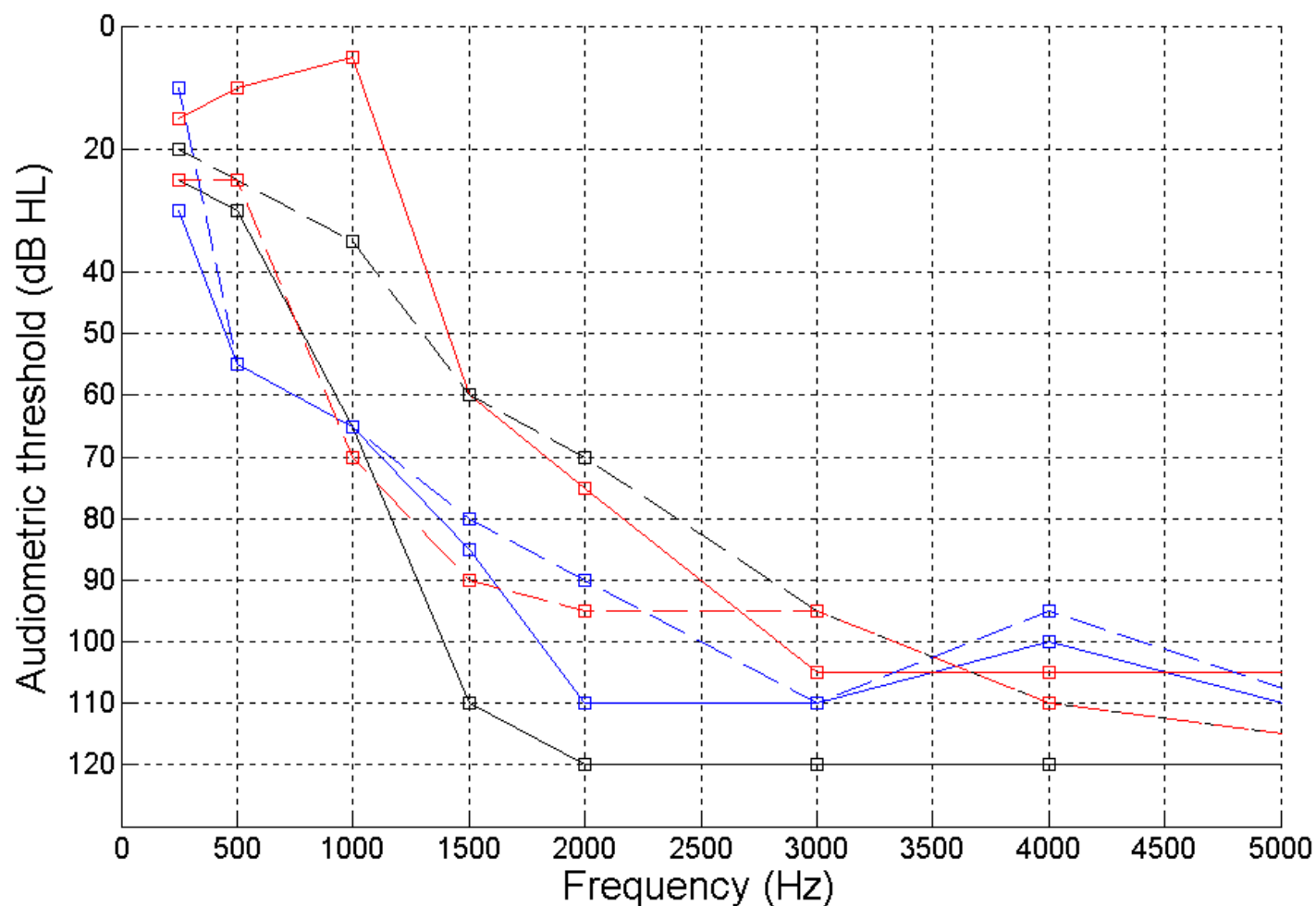
Baer, T., Moore, B. C. J., & Kluk, K. (2002). Journal of the Acoustical Society of America, 112, 1133-1144.

Audiometric data for ears with and without dead regions

[from Vickers et al. (2001) & Baer et al. (2002)]

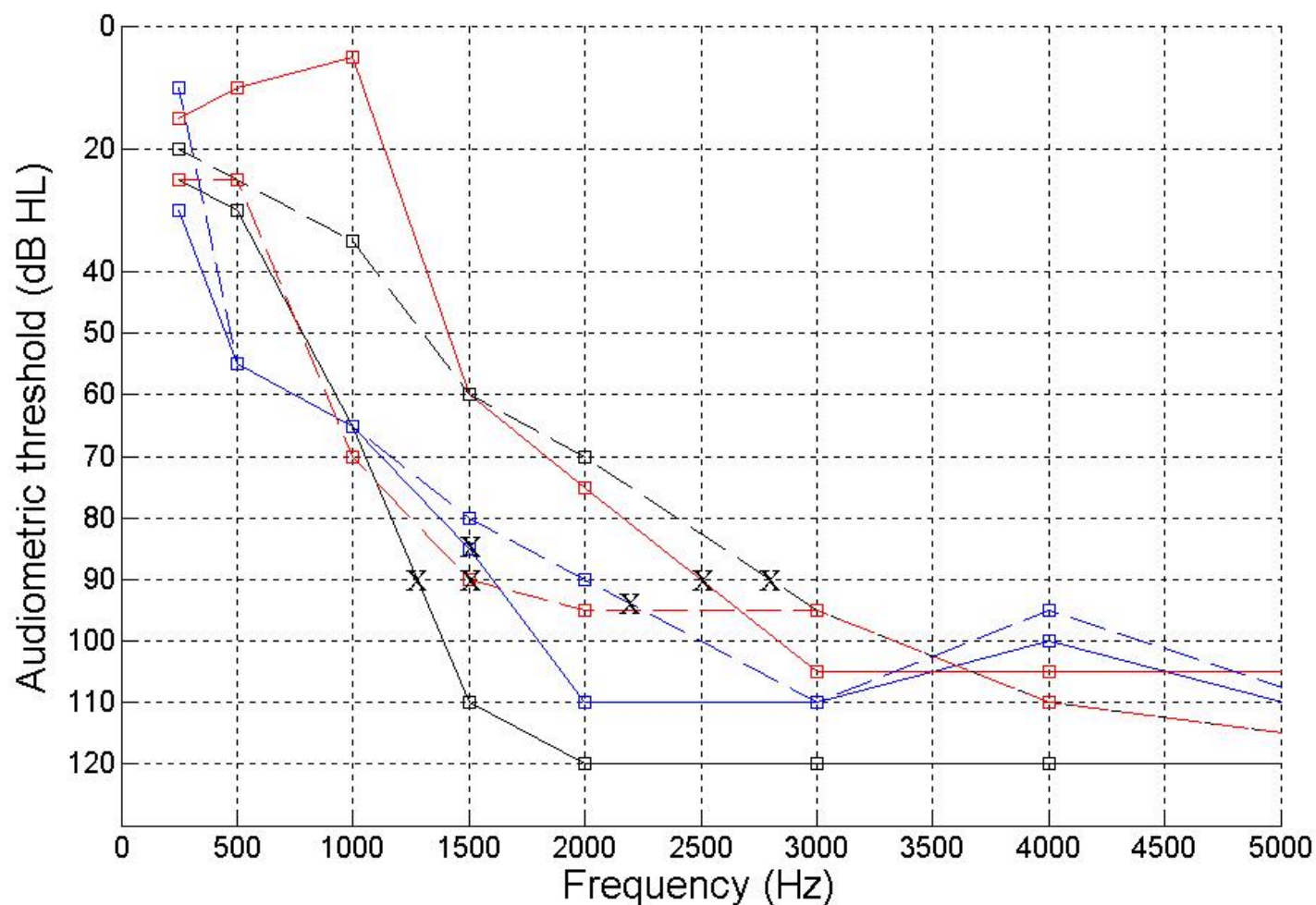


If these audiograms were all you had, would you attempt broadband amplification? If not, at what frequency would you be likely to “give up”?

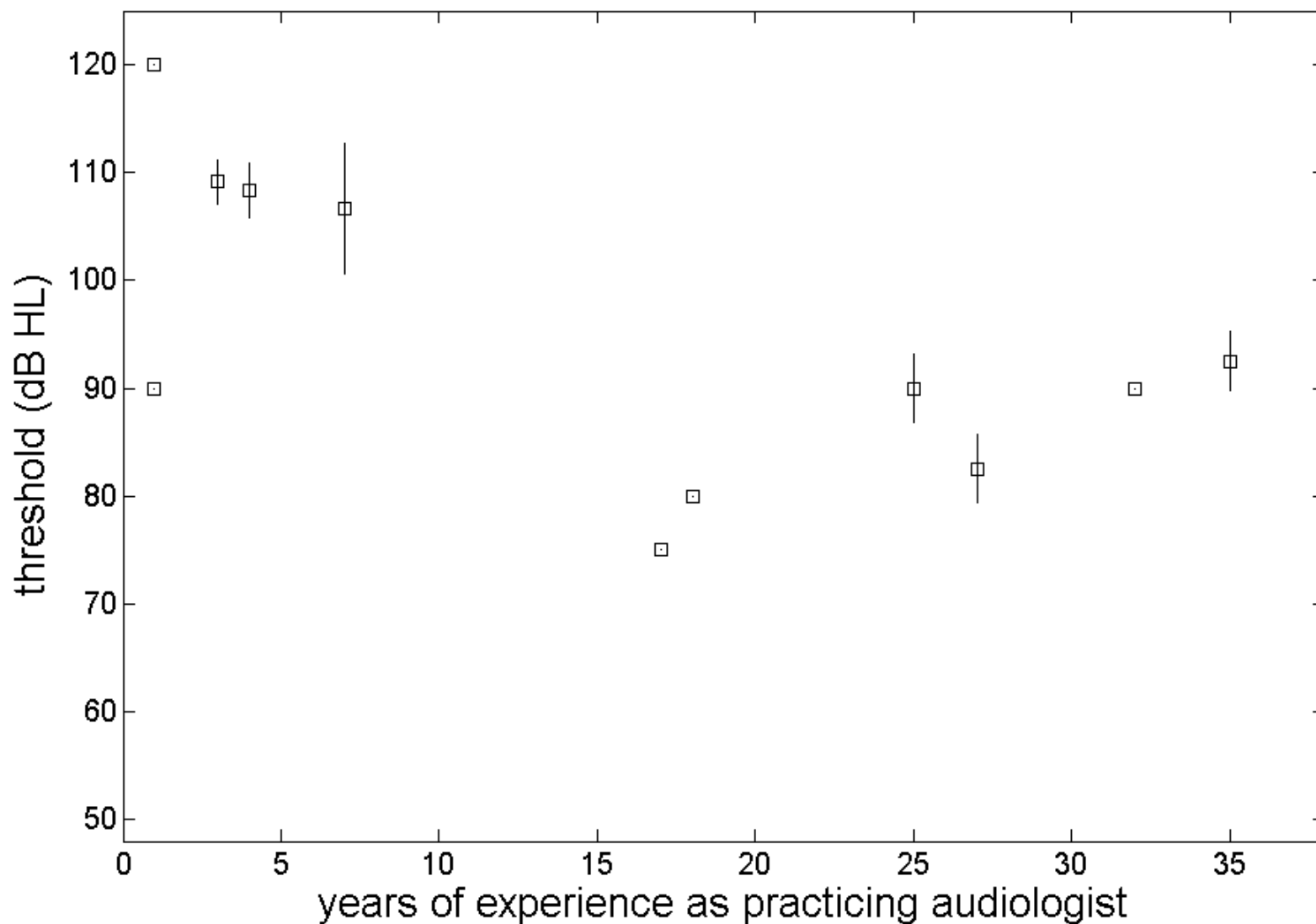


audiograms based on Baer et al. (2002)

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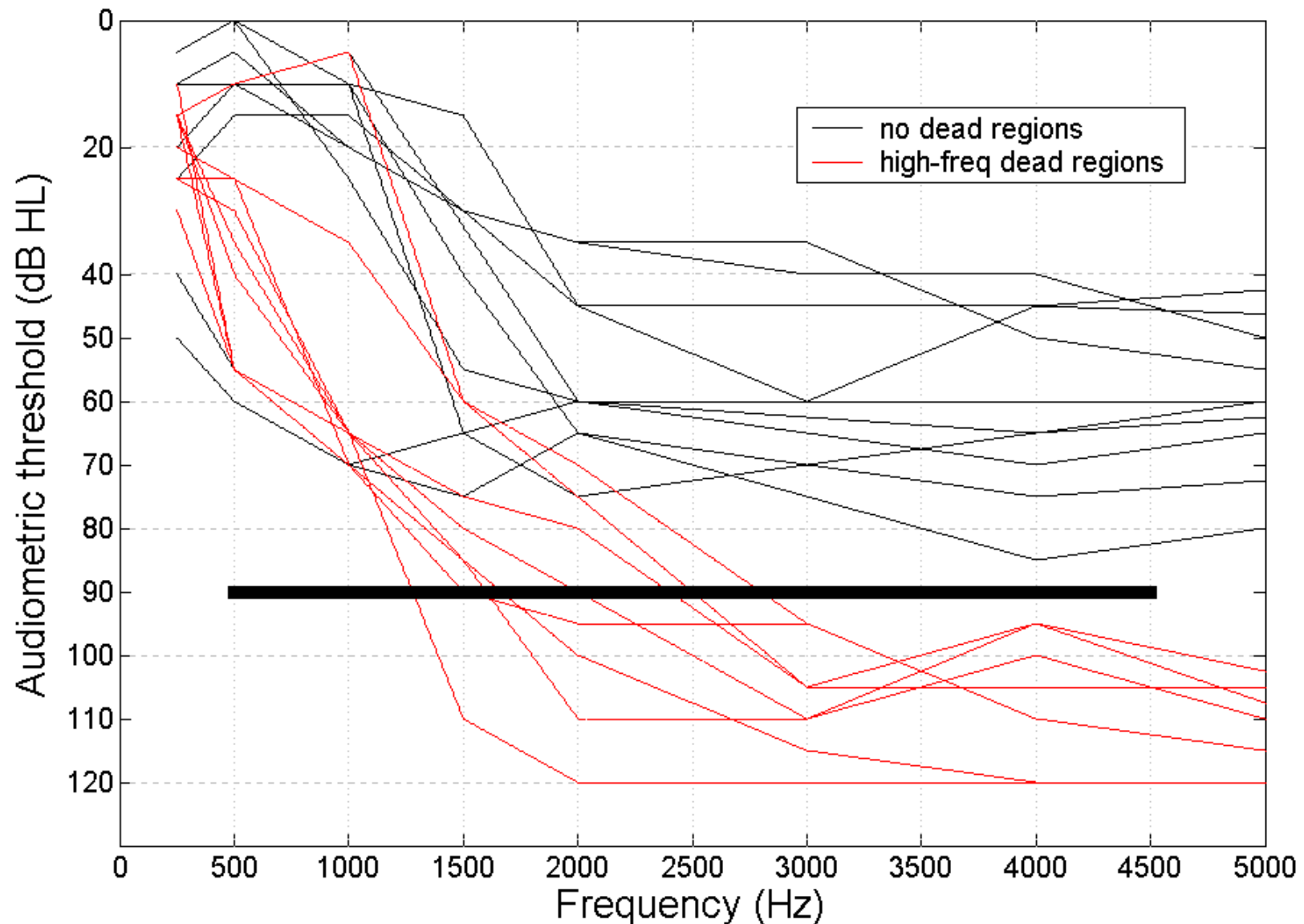


Amount of high-frequency loss where amplification judged unlikely to provide benefit

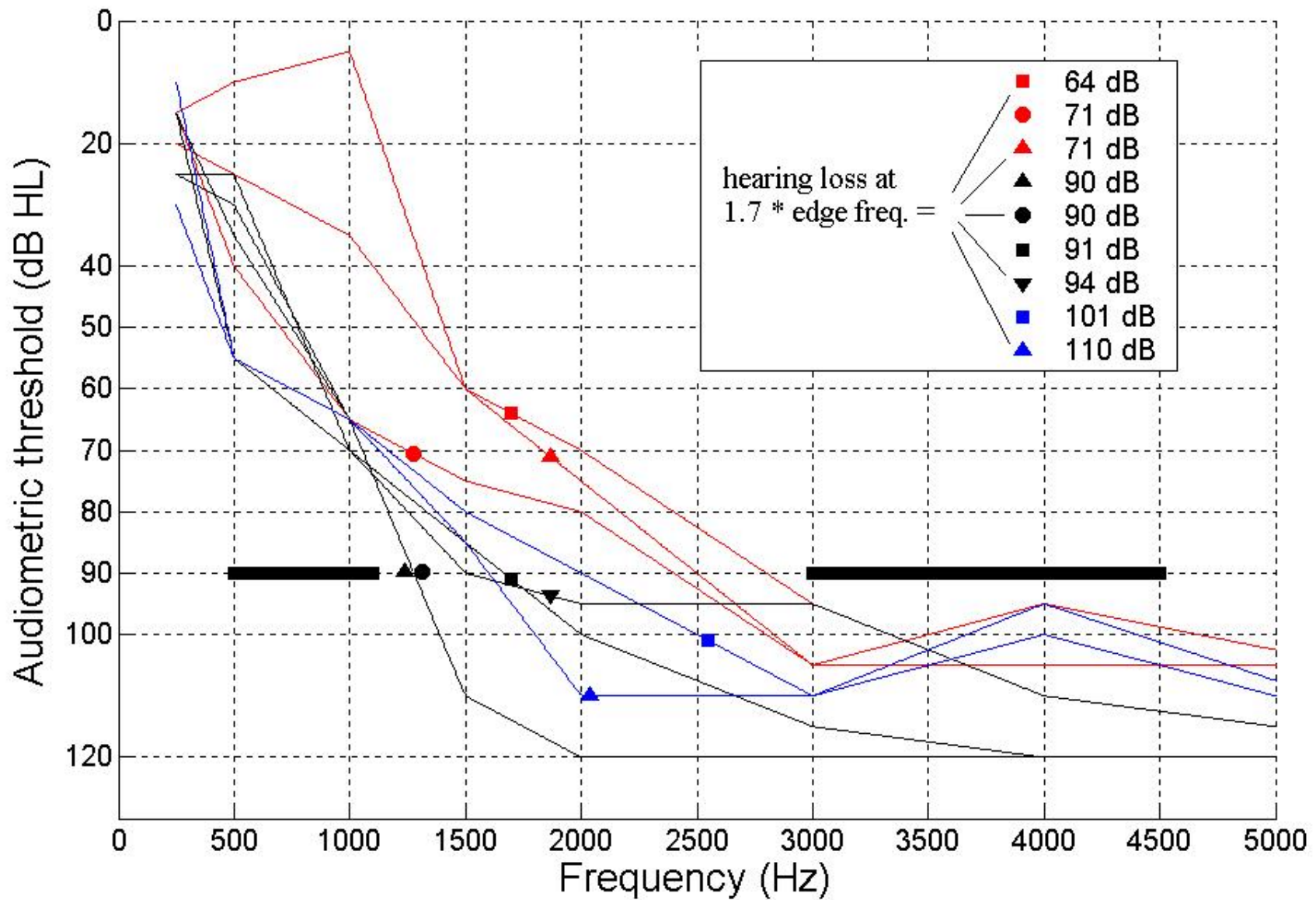


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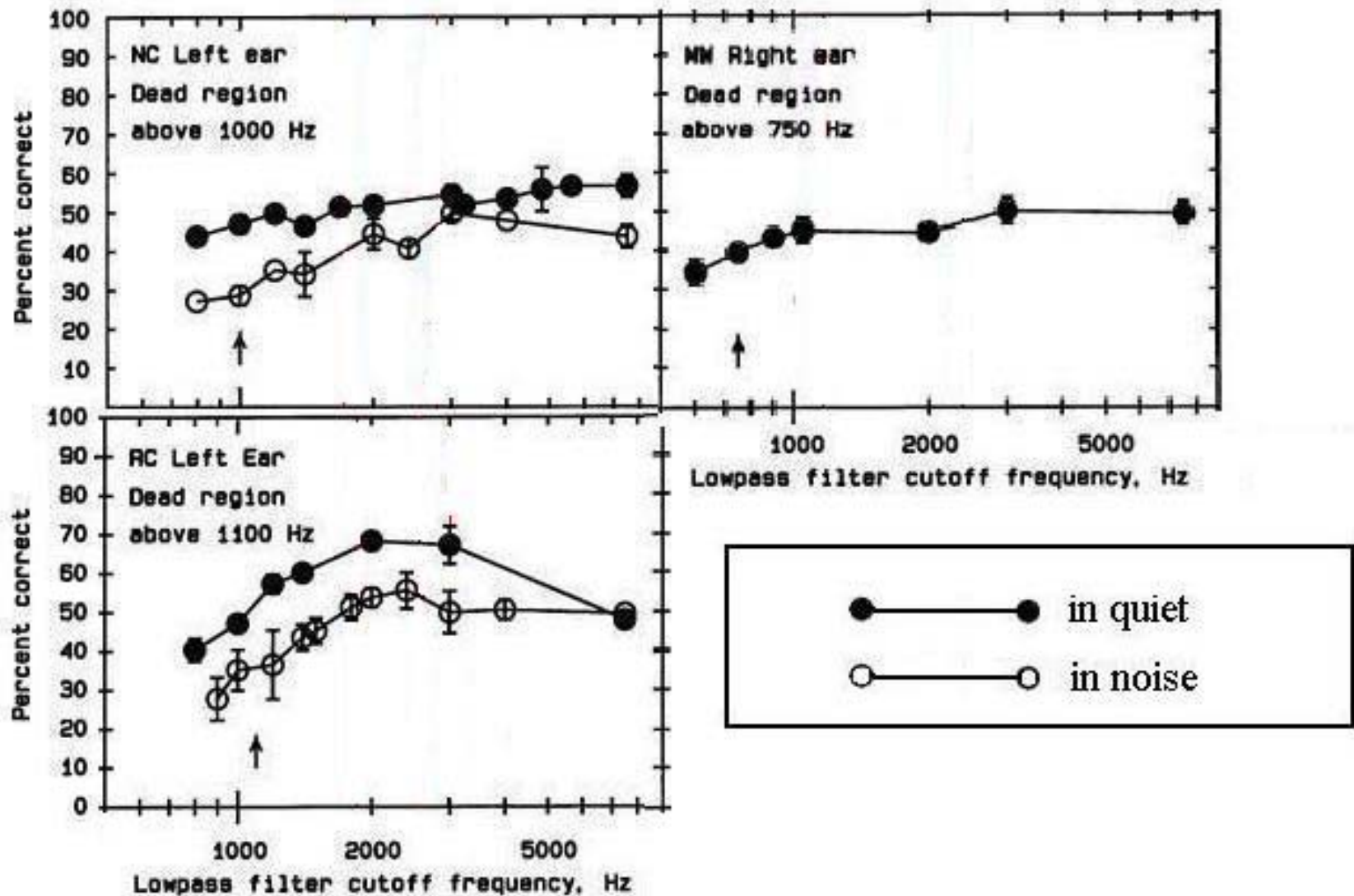


[from Vickers et al. (2001) & Baer et al. (2002)]



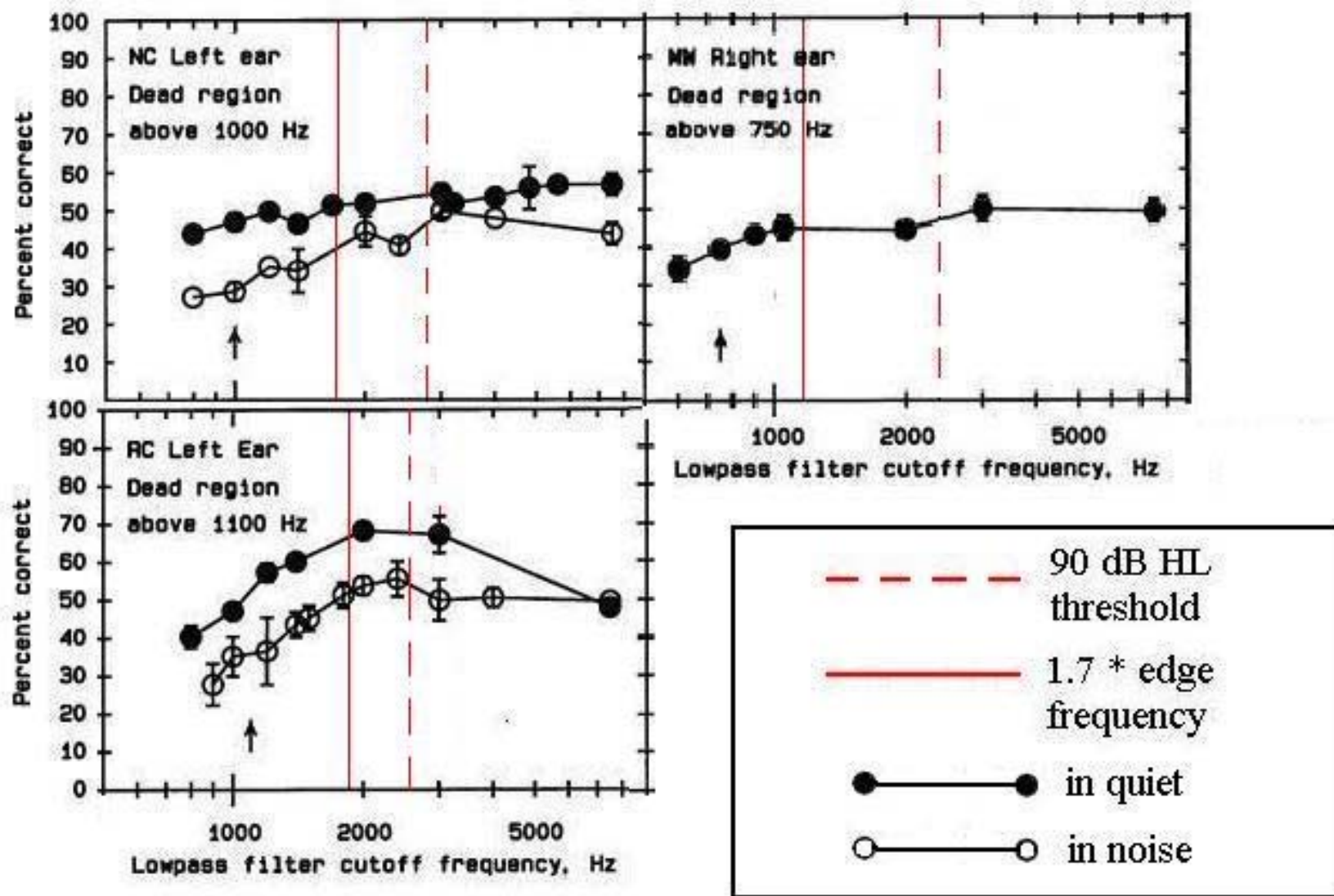
Consonant ID performance by 3 listeners with high-freq dead regions

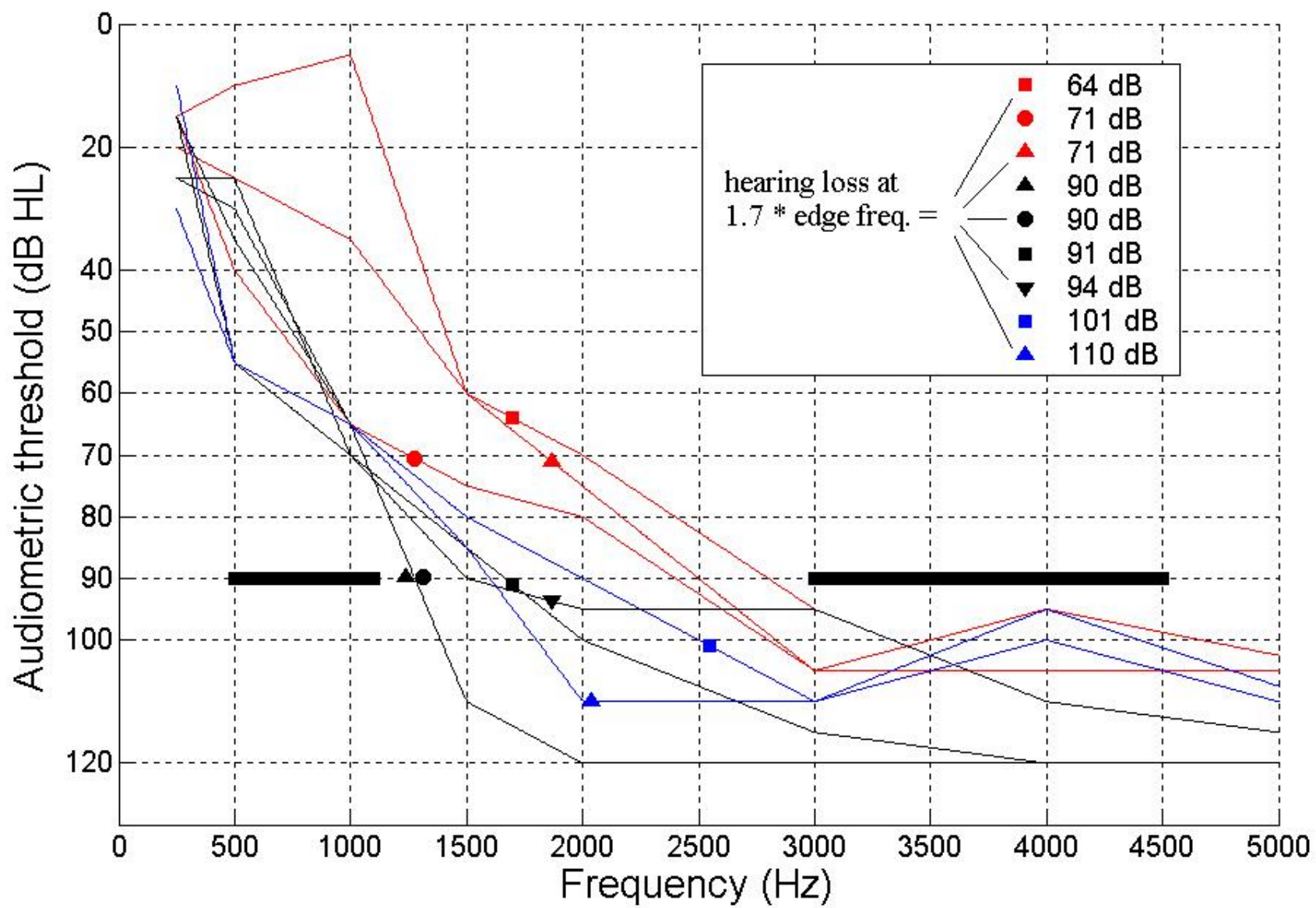
[from Vickers et al. (2001) & Baer et al. (2002)]



Consonant ID performance by 3 listeners with high-freq dead regions

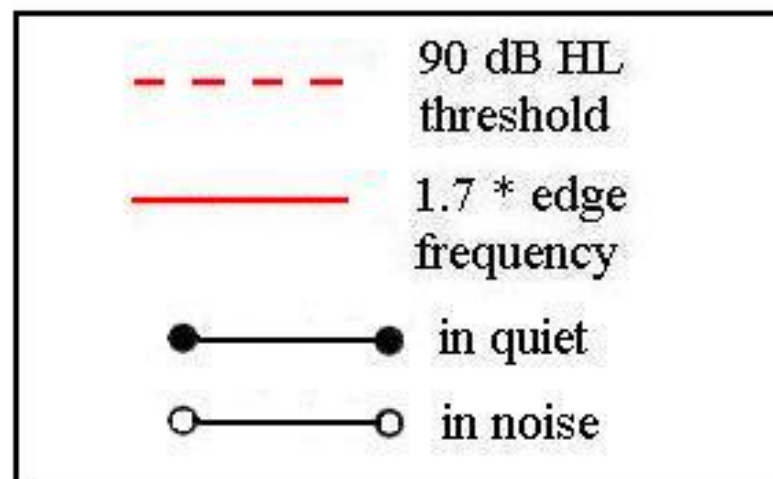
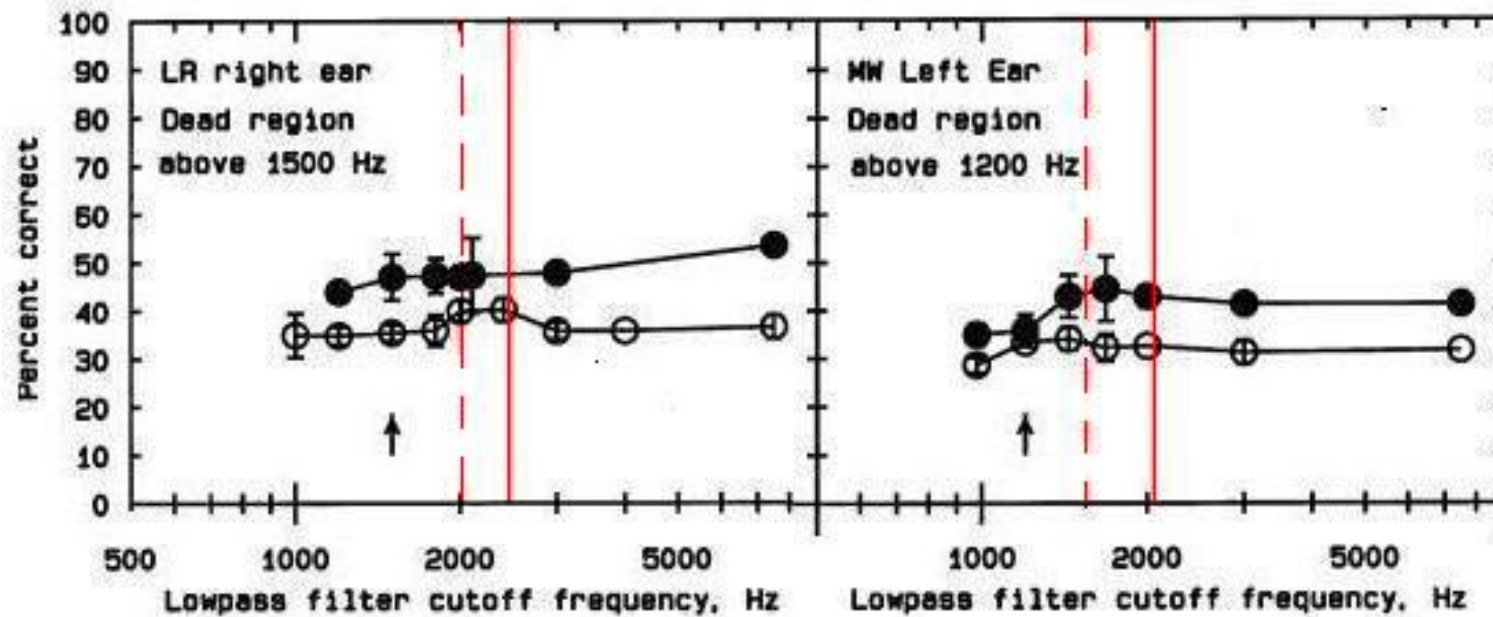
[from Vickers et al. (2001) & Baer et al. (2002)]





Consonant ID performance by 2 listeners with high-freq dead regions

[from Baer et al. (2002)]



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It isn't clear that we can.

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